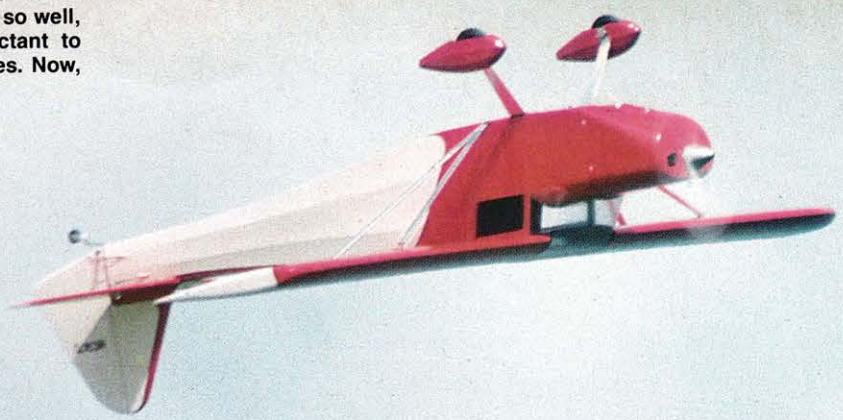
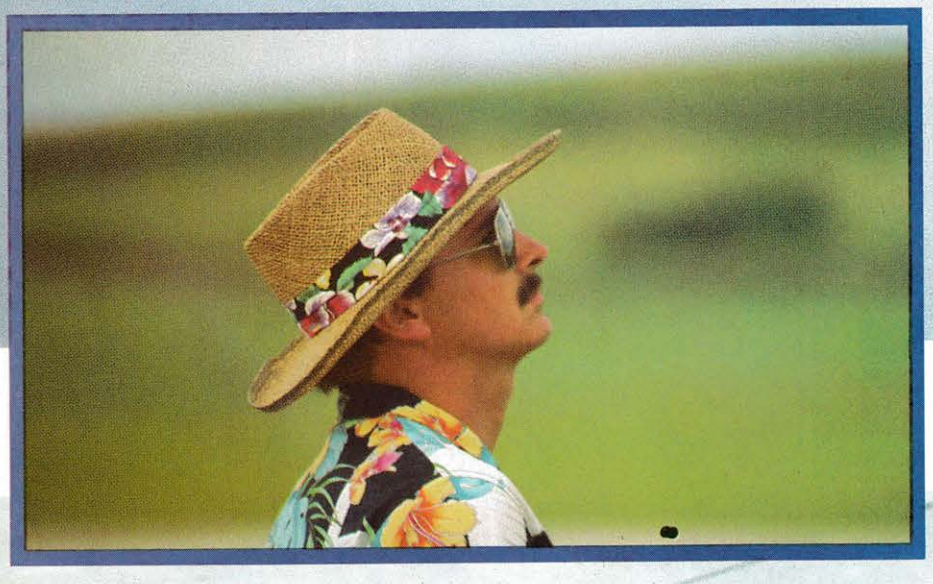
For some reason, the light weight T'Craft resists making snap rolls, but flies so well, low and slow, that Hiller is reluctant to change any wash out or incidences. Now, would you?





Since these pictures were taken, Hiller has re-designed the landing gear in a more scale configuration to better handle rough fields.

JIM HILLER'S CLIPPED WING TAYLORCRAFT

Outstanding Aerobatic Model at Byron's Aviation Expo '87 – Jim Hiller's Lightweight Clipped Wing T'Craft.

NORM GOYER

I've often wondered how one of the best-performing light aircraft of the thirties ever fell into obscurity? It's always been a mystery to me. Maybe the Taylorcraft's designer, C.G. Taylor, didn't have a P.R. man, or it could be that, although the T'Craft was a very well thought out design and it flew very well, it just didn't have any really distinctive features?

Now, the Cub was bright yellow with a black lightning bolt on each side; the Stinson had graceful gull wings; the Ercoupe had a low wing, twin tails, and a nosegear; and Bellancas had three tails and a wooden wing. Cessnas didn't have any wing struts until the C-120 after the war. Early Aeroncas looked like bathtubs and Fairchilds had long noses or short noses and loads of wing and landing gear struts. The Beechcraft Staggerwing had retracts and the lower wing in the wrong position (at least that's what people with Wacos, Stearmans and Travelairs thought).

This all began in 1929, when C.G. and his brother started Taylor Aircraft Company Inc. Their first aircraft was a cute little side-by-side light aircraft called the "Chummy," which evolved into the very first "Cubs," the Taylor Cub E-2, and the Taylor Cub F-2. When Taylor ran out of money, he sold the manufacturing rights to his Cub to the Secretary-Treasurer of his Taylor Aircraft Company, who was none

Jim is seen here preparing his light-weight T'Craft for one of the many exhibition flights he performed at Byron's Expo 87, last summer.

other than William T. Piper in 1935. Old Bill, who was a very good businessman, soon changed the name of that dandy little airplane from Taylor Cub to Piper Cub, and the rest is history. Even now, more than fifty years later, many newspaper, radio and television newsmen still identify almost any aircraft, smaller than a 747, as a Piper Cub. How's *that* for product recognition!

Anyway, C.G. Taylor thought he was all through with airplanes, so he went fishing for two years, but he soon found himself drawing outlines of a brand *new* aircraft on the bottom of his rowboat, and he came back to aviation. In 1936, Taylor started a new company called the Taylorcraft Aviation Corporation and began producing the Taylorcraft, Models B, C, and D. He also sold the manufacturing rights, to an English firm, which went on to produce 1600 T'Crafts in England under the name Auster.

During World War II, Taylor joined the war effort by providing 1,900 L-2 Grasshoppers, TG-6 training gliders, and components for the PBY, C-46 and A-26. Then, in 1945, when the war was over, old C.G. built 2,800 Model B12-Bs, until the company was forced into bankruptcy in 1946. Undaunted, the company resurfaced in 1947 as Taylorcraft, Incorporated, and produced many variations of the BC-12, including a four-place model which never did become popular. Despite many difficulties, Taylor continued to produce airplanes in various locations, until 1958, when the company ceased operations one more time.

In 1973, another attempt was made to revive the Taylor BC-12, this time by powering it with a Continental 0-200 (100 hp) engine, and naming it the "Sportsman," but that endeavor was not financially profitable either.

On a brighter note, just two years ago, in 1986, a new firm decided to reactivate the Taylorcraft, this time with a Lycoming 110 engine. This company hand-crafts each airplane to order, and have reportedly produced about twelve of the "new" models at this writing. Like the Cub, a good design never really leaves us; it just takes a vacation for a few years while waiting for another aircraft lover with fond dreams of the original aircraft, and hopefully, some solid financing, to introduce it *one more time*.

In reality, with his second plane, the Taylorcraft, C.G. Taylor had designed an *even better* aircraft than his Cub, and that was a hard act to follow, because EVERYBODY loved the Cub. The T'Craft was a different, very light aircraft with side-by-side seating, and a large wing whose airfoil was not of the "Clark Y" family widely used at that time, but was thinner, with more than a hint of the modern symmetrical airfoil.

In fact, the early 1938 and 1939 models were *so* light that, on a hot summer's day, on a blacktop runway, they just didn't want to stop flying, and were very difficult to land. I think it was because of them that the words "floater, and ground effects" were coined. I remember flying into Barnes Airport in Westfield, Massachusetts one day with a friend of mine, and after several attempts at landing, we finally had to open both doors wide to create enough drag to get that little bird down on the runway. Years later, they implemented the same theory on the side of F-86s, and called them speed brakes.

My first acquaintance with the T'Craft came early in my civilian flying career. The local airport had quite a number of aircraft to rent. They had just received several new Aeronca 7AC Champs, a Cessna 120, an Aeronca Chief with a hand crank starter, a Bellanca 14-13-12 which would fly at 150 mph on a 150 hp Franklin. They also had several surplus PT-19s and 23s. This left the poor little 1939 Taylorcraft sitting on the ramp, gathering dust, so they lowered the rental to $7.00 an hour (wet) to get some flight time on it. Being young and broke at the time, this was the aircraft I rented until my finances were in better shape. Forty years later, and I'm still waiting. The very light T'Craft was a delight to fly. With the stock seats in the aircraft, it was almost impossible to wear a surplus chute, so the style of aerobatics you performed were based on how brave you were, not what the aircraft would perform.

Shortly afterwards, a small seaplane base opened up on the Connecticut River, and the operators added two brand new Taylorcraft float planes to their "fleet." Rental on the little T'Crafts was also reasonable, so I spent many enjoyable hours flying around in those T'Crafts, alone or with a friend. The performance of the Taylorcraft was amazing, especially when you consider it was on floats, with two persons aboard, a full gas tank, and only a 65 hp Continental.

With the trims properly set up, it would cruise at about 90-93 mph. On land, equipped with wheelpants, you could count on getting 100 mph from the T'Craft, so you can see, it was a far better performer than C.G. Taylor's original design, the Cub.

Modelers who have built both Cubs and T'Craft know that their individual characteristics follow each aircraft into their scaled-down sizes, and early model manufacturers recognized their potential. Almost from the day the full-scale T'Craft was introduced, back in the late thirties, a 1/4 scale model of the fine-flying bird was brought out by Miniature Aircraft Corporation, Staten Island, New York. In 1944, a 36-inch rubber-powered scale model of the T'Craft was made available to modelers at a cost of $2.50! A few years later, another Taylorcraft was produced, and this time it was a 1/4 scale nine-foot gas-powered free flight design. Advertisements for the aircraft showed that, for $17.50, you could buy the complete kit, (less wheels and engine). Recommended engines were a "C" motor, or one of the new twins which were beginning to hit the marketplace.

When I decided to write this story about T'Crafts, I called John Pond, the eminent expert of plans, and asked him what he had in the way of plans for this bird. He told me that he had 1/4 scale Miniature Aircraft plans which appeared to have been scaled up from the 36-inch rubber powered kit, and that it's been one of his best sellers. As soon as I received them, I studied John's T'Craft plans, and it looks like it's a natural for electric power or for a small 90-size engine. I think it should make a very good scale trainer.

In the early sixties, Clipped Wing T'Crafts won several aerobatic championships, and one such plane, formerly owned by the late Margaret Ritchie, is still

TAYLORCRAFT

based at Flabob Airport in Riverside, California.

Just last year, T'Crafts started showing up at scale meets and contests. Most modelers prefer the clipped wing version, and they're available now, from the 1/3 scale Bob Neilitz designs, down to a smaller one produced by Rousch.

The aircraft which prompted me to write this article, however, was the one I saw in action at Byron Originals Aviation Expo '87 this past summer. Jim Hiller designed his T'Craft to be the right size for an OS 108 two-stroke. He built it *very* light, carefully choosing his wood by what he calls the fingernail test. He also constructed it to be especially strong in the wing-attach area, which is stressed for over 3 Gs without the wing struts. Those thousands of modelers who saw Jim consistently, literally steal the show at Byron's with his classic clipped wing T'Craft every day will be pleased to know that, by the time you read this, plans for his plane will be ready to ship. Jim advises modelers to "Keep the weight up high, and keep the bird light." For those readers who weren't lucky enough to be at Byron's, what Jim did was to actually *hover* the model on its prop, and dance it along, above the runway, to the beat of the music from the loudspeakers. When he was through with *that* mind boggler, he then put his T'Craft through a complete aerobatic routine, inches above the ground, both upright and inverted. Jim tells us that the only problem with his aircraft at this time is its hesitancy to perform snap rolls, but that he's now experimenting with stall strips out by the ailerons.

The clipped wing model seems to be the most popular T'Craft, and one or two show up at many of the large contests.

Duane Cole, the famous aerobatic pilot, also flies a clipped wing T'Craft in some of his demonstrations, and he added stall strips on its wingtips to get his aircraft to snap too.

Jim has graciously volunteered to share with our readers, some of the concepts and building tips for his 1/4 scale Clipped Wing Taylorcrafts, which we're reprinting here for your information, in Jim Hiller's own words:

CLIPPED WING TAYLORCRAFT

The inspiration for this model came from watching the master himself, Duane Cole, fly his clipped wing Taylorcraft through his many airshow routines. His aerobatic routine is wonderful due to its slow speed and precision flying. The super slow roll he performs is incredible, flown at the Taylorcraft's slow speed, and is 15 seconds in duration. Duane Cole has proved that a modified Taylorcraft is an aerobatic aircraft few others can match. Today's aerobatic pilots have rediscovered the modified Taylorcraft as a serious mount for sport and competition aerobatics. The "Slick" conversions available today are extremely popular, resulting in many examples of the clipped wing Taylorcraft to be modeled.

The model presented here is a standoff scale model of Duane Cole's Clipped Wing Taylorcraft, with an emphasis on duplicating not only the appearance, but also the flight characteristics of his aircraft. To achieve these goals, particular attention was given to weight, control surface setup and power. Two major deviations to scale were made in this model to improve its flight characteristics. The height of the fin and rudder has been increased to improve yaw stability. The second change is in the aileron hinge line which has been relocated from the top leading edge of the aileron to the bottom, about 3/4 of an inch from the aileron leading edge. This second change, combined with the aileron travel differential built in, results in extremely responsive aileron control at all airspeeds.

The importance of light weight, relative to the flight performance of this model, cannot be overemphasized. A model's weight affects its vertical performance, response to control inputs and stall speed. Most modelers quite simply build weight into their models. The most effective way to reduce the weight of model aircraft is to simplify them. If you do not design any more material into a model than is necessary, then you do not design in any unnecessary weight. Stick-type construction for the fuselage and tail surfaces is a proven method of reducing the weight of a model, without sacrificing its strength.

Lightweight models do not just happen; one must think about *where* weight is built into the model. Select the balsa you use, looking for straight grain wood. Pick up two sheets of balsa, one in each hand, and compare their weight. Put the heavy sheets in one pile, and the light sheets in another. The heavy pile can be cut up for cap strips and spar webs; the lighter sheeting is for wing ribs and sheeted areas. Do the same with your balsa sticks. The light sticks go in the construc-

tion of your model airplane; the heavy pieces are wing spars and paint sticks. Do not build weight into your model.

Another feature of my prototype model clipped wing Taylorcraft has been its quiet performance. This turned out to be easy to do. The model is so light, and has such a large wing and fuselage to fly on, that all maneuvers are flown with half throttle, except for the torque roll and knife-edge loop. This may sound strange, but even normal knife-edge flight is flown at partial throttle and partial rudder. This allows use of the rudder and throttle to make altitude corrections during a knife-edge pass. Another advantage of not using full throttle during aerobatic flying is that the slower airspeeds allow you more time to fly the maneuvers, and more time to see and correct small errors.

The engine in my model is the O.S. Max 1.08 FSR. I cannot say enough good things about this engine. It's powerful, reliable and quiet, just as it comes out of the box. A 16/6 propeller is used on the prototype, which is a bit large for this engine, but it provides greater pulling power at the slower speeds at which this model flies. Remember one thing, a large propeller lugs down a motor to lower its rpms, and that reduces the noise output of the engine.

DUANE COLE'S CLIPPED WING TAYLORCRAFT

SPECIFICATIONS

Scale:	3 in. = 1 foot
Wingspan:	89 inches
Wing Area:	1,420 sq. in.
Empty Weight:	10 1/2 lbs.
Wing Loading:	17 oz. / sq. ft.
Engine:	O.S. Max 1.08

CONSTRUCTION NOTES

Fuselage:

1. Build the two fuselage halves. All wood is balsa except the 3/8 square spruce vertical between the front landing gear block and the wing carrythrough. The 3/8 square balsa longerons must be soft balsa to allow bending the complex curvature required in the rear half of the fuselage. The 3/8 sheet rib outline should *not* be installed at this time; only the 3/8 sheet connecting the rear upper longeron to the 3.8 square vertical located at the midpoint of the chord should be installed.

2. Join the two fuselage halves, starting at the widest part of the fuselage, using the 3/8 square balsa and the landing gear blocks. Pull the nose together and install the 3/8 square cross pieces and the 1/4 sheet cross piece. Glue the rear of the fuselage together. Make sure the fuselage is straight and square, and allow it to dry. Once dry, pull the fuselage sides in at the rear, and install the 3/8 square cross pieces.

3. The forward fuselage formers for the top decking can now be installed. The engine mounting box should be built and installed next, then the 1/16 top deck sheeting. Note that the 3/4 triangle stock and the 1/16 plywood sheet extend from the firewall to the instrument panel serving as a fuel tank mounting tray. Add the 3/16 balsa side sheeting to the nose of the fuselage.

4. The wing carrythrough consists of two 1/16 x 1 5/8 x 10 1/2 plywood sheets, spaced by two 3/8 square spruce pieces. Epoxy this structure together. The wing tongues must fit into this carrythrough. A file can be used to trim the wing tongues to fit them into the finished carrythrough. Epoxy the carrythrough to the 3/8 square spruce vertical, using scrap 3/8 trimmed to the correct angle for alignment of the carrythrough. Once the epoxy sets, pin the carrythrough to the 3/8 square spruce vertical with 1/16 diameter wire.

5. Glue the 3/8 sheet rib outline and the 5/16 x 1 1/2 balsa trailing edge stock in place. Glue the 1/8 sheet sub-ribs surrounding the top hatch in place. Sheet this area with 1/16 sheeting.

6. Build the top hatch in place on the fuselage. This hatch is hinged in the front and secured in the back with an 8-32 nylon bolt. This top hatch allows access to the wing bolts and the radio. I recommend installing the radio just aft the top windows, behind the rear wing tube.

7. Cut a piece of 1/8 sheet to fit the opening below the fuselage just forward of the front landing gear block. This hatch is to allow access to the fuel tank. Secure with 8-32 nylon bolts in all four corners.

8. The fuselage stringers are 3/16 square spruce and can now be installed.

Wing Construction:

1. Build the wing panels over the plans. Note that the wing tongue is 3/8 square spruce, epoxied to the inside of the 3/8 square balsa wing spars. Add scrap balsa filler between the spruce squares of the wing tongue.

2. The aileron hinges consist of 1/16 diameter piano wire and 1/16 I.D. brass tubing. They are designed to allow removal of the aileron for covering and linkage adjustment by removing the 1/16 diameter piano wire at the wingtip. The 1/16 diameter piano wire at the inboard end of the aileron is epoxied in place in the wing, just slide the aileron off the wire at this end for removal.

3. The rear wing tongue consists of a 3/8 outside diameter brass tube extending out the inboard end of the wing. This should be epoxied in place during construction of the wing panel. Allow them to extend out two inches. Support the two ribs through which the brass tubes extend with some 1/16 plywood to distribute the loads.

Tail Surfaces:

1. The stab, elevator, fin, and rudder are built over the plans. They are simply stick-type construction.

Cowl:

1. Start the cowl construction by cutting out the nose bowl. The two side sheets, the top sheet and top corner pieces are then glued into position. I suggest building the cowl on the fuselage to aid in building a straight cowl. Allow the cowl to dry.
2. Sand the bottom edges of the side sheets to the angle shown on the plan section views to fit the lower corner balsa sheets. Glue the lower corner sheets in place along with the bottom sheets.
3. Final shape and sand the cowl. Mount the cowl in the method you prefer. I mounted my cowl with 8-32 nylon bolts through the side sheets (with plywood backup) in the four corners.

Final Assembly:

1. The final fitting of the wing panels to the fuselage must be accurate. Slide the spruce wing tongues into the carrythrough, and the 11/32 O.D. brass wing tongues into the 3/8 O.D. brass carrythrough. Align the wing panels and epoxy the 3/8 O.D. brass carrythrough in place in the fuselage. Be careful not to get epoxy on the 11/32 O.D. brass wing tongues, as this will epoxy the wings onto the fuselage. Once the epoxy sets, push the wing panels in against the 3/8 sheet rib outline on the fuselage, and drill the carrythrough for 6-32 Allen Head Socket screws. Drill the rear brass carrythroughs for 1/16 diameter piano wire pins. Leave these rear pins long enough for the top access hatch to be able to hold them in.
2. Wing strut construction is discussed on Sheet #2 of the plans. Do not epoxy or drill for the retaining bolts until the wing struts have been fitted to the wing and fuselage. Set the length of the front strut to set the dihedral, and the rear strut to assure that you do not force a warp in the

wing panels with the wing struts. The wing struts are secured to the wing panels and the fuselage with 3/32 diameter wheel collars. Removal of the wing panels from the fuselage only requires that the inboard fuselage wheel collar be removed, the struts staying attached to the wing panels.

Since you last saw my Taylorcraft at Byron's Expo '87, it has received additional detailing, including the completing of the trim to duplicate Duane Cole's aircraft. The landing gear has also been replaced with a version similar to that of the normal Taylorcraft gear. This landing gear revision was necessary due to the rough field I've been flying out of. Taylorcraft's original style gear has turned out to be a more durable landing gear, better able to absorb the harsh bumps on the field.

Jim Hiller's 1/4 Scale Clipped Wing Taylorcraft Plans may be obtained for only $25.00, which includes Postage & Handling, by writing: Jim Hiller, 37317 Fieldstone Road, Randallstown, MD 21133 or phone (301) 922-6786 ●